

ARTCAM-2020UV-CL

Camera Link Settings Manual

rev.1.06

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1. Introduction

This manual is for overall settings of cameras with Camera Link. Please refer to the camera instruction for more details of cameras.

This manual is especially for the following model:

Table 1-1: Target Model							
Model Pixels Frame Rate							
ARTCAM-2020UV-CL	4M	23fps					

2. Device and System Requirements

To use a Camera Link camera, the following devices and software are required. Please have them prepared before starting the camera.

Item	Note
Camera Link Frame Grabber Board	Compatible with Base Configuration
Viewer Software	Software accompanying with grabber board,
	or ArtMeasure
Serial Communication Software	e.g. Tera Term
PC	Any which can adopt items mentioned above.
Camera	
Camera Link Cable	The connector joining to camera should be SDR.
AC Adapter	Please use the AC adapter we offer

Table 2-1: Minimum Requirements

All the settings in this manual are under the condition with following devices which we recommend. While using other devices, users could adapt settings correspondent to the devices.

Item	Recommendation
Camera Link Frame Grabber Board	PIXCI®EB1 (Manufactured by EPIX)
Viewer Software	XCAP for Windows Lite
Serial Communication Software	Tera Term



3. Camera Link Format

3.1. Format

The following table shows the format of Camera Link compatible with this camera.

Table 3-1: Format List									
Configuration Tap Significant Bit Color Clock Frequency									
Base	12bit×2tap	12bit (MSB Justified)	Grey Level	85.000MHz					

Note: Since the pixel clock is 85Mhz, it may not work with a 10m cable.

3.2. Resolution

The following table shows the maximum pixels of this camera.

Table 3-2: Resolution							
Model Horizontal Pixels Vertical Pixels							
ARTCAM-2020UV-CL	2048	2048					

4. Connector Pin Assignment

The connector pin assignment is as follows:

Pin No.	Signal Name	Pin No.	Signal Name							
1	GND	14	GND							
2	X0-	15	X0+							
3	X1-	16	X1+							
4	X2-	17	X2+							
5	XCK-	18	XCK+							
6	X3-	19	X3+							
7	RX+	20	RX-							
8	TX-	21	TX+							
9	CC0-	22	CC0+							
10	CC1+	23	CC1-							
11	CC2-	24	CC2+							
12	CC3+	25	CC3-							
13	GND	26	GND							

Table 4-1: Connector Pin Assignment



5. Communication Specifications

5.1. About the settings of the product.

To change or check the settings of the Camera Link camera, you can send command to the camera through a serial communication software.

. ..

5.2. Communication Method

The serial communication method is as follows:

Item	Contents
Communication Form	Asynchronous serial communication
	(In accordance with standards of RS232C)
Baud Rate	9600bps
Data	8 bit
Parity	None
Stop	1 bit
Flow Control	None

5.3. Command Format

Please give command to the camera through serial communication software with the format listed below. If the format is not correct, the camera could not be controlled.

Please be sure to use half-width characters of ASCII code.

	1	2	3	4	5	6					
Format	cmd		-opt		val	<┘(CR or LF or CR+LF)					
Details	1: On	e letter	which	repres	ents th	e main purpose of the command.					
	2: One space (blank) as delimiter. (Omissible)										
	3: Option correspondent with the main purpose.										
	The	e forma	it is a le	etter go	ing afte	er a "-".					
	4: On	e spac	e (blan	k) as d	elimite	r. (Omissible)					
	5: Val	ue sett	ing: en	ter the	value i	f necessary.					
	Dee	cimal n	umeric	al valu	e: ente	r the number directly.					
	He	kadecir	nal nur	nerical	value:	enter the number after an "x."					
	The	e defau	lt value	e would	l be 0 if	there is no value entered.					
	6: Lin	e feed	code								
Response	Normal: OK섿(CR+LF)										
	lf response is a value: " <i>value</i> "쉬(CR+LF)										
	Abno	rmal: N	lG⊲∄(C	R+LF)							
Note	The c	ommai	nd will I	be disti	nguish	ed once the line feed code is sent out.					
	lf any	none-l	half-wi	dth cha	aracter	s are typed (e.g. BackSpace)					
	befor	e line f	eed co	ode, the	e respo	onse must be NG.					
	(lf on	ly line ⁻	feed co	ode is t	typed,	there will be no reaction.)					
	lf you	want t	o canc	el the c	omma	nd, type a none-half-width character					
	befor	e line f	eed co	ode, the	e respo	onse will be NG.					
	It doe	sn't ma	atter the	e letter	s of co	mmand is in upper case or lower case.					
	Optio	n is orr	issible								
	(In thi	s case	, a defa	ault opt	ion will	be chosen automatically.)					

Table 5-2: Command Format

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5.4. List of Commands

The commands listed below shows controllable functions.

For more details of each commands, please refer to "5.5 Commands Details"

Function	cmd	-opt	val	Description
Shutter	i	-V	0	Shutter speed settings (Option is omissible)
Conturo modo	i	-r	-	Preview mode settings
Capture mode		-S	-	Trigger mode settings

Table 5-3: List of Commands



5.5. Commands Details

The details of each commands are as follows. Please refer to the command correspondent to your needs.

5.5.1. Shutter

Table 5-4: Shutter Speed Settings

	1	2	3	4	5	6					
Format	i		-v		val	ئ ا					
Details	1: i = command										
	2: De	2: Delimiter (Omissible)									
	3: -v = Option: shutter speed settings (Omissible)										
	4: Delimiter (Omissible)										
	5: Value of shutter speed										
	6: Line feed code										
Response	Normal: OK										
	Abnormal: NG										
Note	To se	et the s	hutter	speed	in trigger	and preview modes.					
	% То	calcul	ate the	e shutt	er speed	, please refer to the instruction of the					
	came	era.									

5.5.2. Capture mode

Table 5-5: Preview mode

	1	2	3	4									
Format	i		-r	Ŷ									
Details	1: i =	1: i = command											
	2: Delimiter												
	3: -r = Preview options												
	4: Lir	4: Line feed code											
Response	Normal: OK싄												
	Abno	Abnormal: NG쉳											
Note	Conf	igure th	ne cap	ture as	s preview	mode.							

Table 5-6: Trigger mode

	1	2	3	4					
Format	i		-s	Å					
Details	1: i = command								
	2: De	2: Delimiter							
	3: -s = Trigger options								
	4: Line feed code								
Response	Norm	nal: OK	ک						
	Abno	rmal: N	۹C∜						
Note	Confi	igure th	ne cap	ture as	Trigger r	node.			



5.6. Timing chart



	Description	Value	Units
А	FVAL High	3705757	clk
В	FVAL pos. edge to LVAL pos. edge	15	clk
С	LVAL High	1024	clk
D	LVAL Low	785	clk
Е	LVAL neg. edge to FVAL neg. edge	1695	clk
F	FVAL Low	24000	clk
G	LVAL pos. edge to DVAL pos. edge	0	clk
Н	DVAL High	1024	clk



5.7. Bit assignment

CL Dort/Bit	Data			Camera	10 Di+
	12bit			out	
AO	A[0]			Tap1	A[11:0]
A1	A[1]		_	Tap2	B[11:0]
A2	A[2]				
A3	A[3]				
A4	A[4]				
A5	A[5]				
A6	A[6]	 -			
A7	A[7]				
BO	A[8]				
B1	A[9]				
B2	A[10]				
B3	A[11]				
B4	B[8]				
B5	B[9]				
B6	B[10]				
B7	B[11]				
CO	B[0]				
C1	B[1]				
C2	B[2]				
C3	B[3]				
C4	B[4]				
C5	B[5]				
C6	B[6]				
C7	B[7]				

	COL 0				COL 2047
ROW 0	A[11:0]	B[11:0]		A[11:0]	B[11:0]
				 	_
ROW 2047	A[11:0]	B[11:0]		A[11:0]	B[11:0]



6. Settings

6.1. Preparation

Before connecting camera to your PC, please install Camera Link frame grabber board, including driver and all the software necessary.

In some cases, it is required to register the license of the product, please complete the registration before starting using the camera.

After installing, please open device manager to check if the grabber board is recognized normally. Make sure that the following two are recognized.:

No.	Device
1	PIXCI®EB1 PCI Express Camera Link Video Capture Board for Win XP/Vista/7/8/10-64bit
2	PIXCI® Camera Link Serial Port (COM3‰1)

※₁: Will be different depending on systems.



Figure 6-1: Sample of device manager

6.2. Connect to Camera

Please connect camera to the Camera Link frame grabber board with Camera Link cable. Before connect AC adapter to the camera, please start up the serial communication software. Command will be sent from the camera once it is connected to the power.



6.3. Example of Serial Communication Software Settings

Here we take "Tera Term" as the example of Serial Communication Software settings. Please start up "Tera Term" before connecting AC adapter to the camera.



Figure 6-2: Icon of Tera Term

After starting the software, please choose the port correspondent with the name shown in device manager. (At the time this manual is made, it is shown as COM3.)

Tera Term: New (onnection
© TCP/IP	Host: myhost.example.com History Service: Telnet SSH SSH version: SSH2 Other Protocol: UNSPEC
 Serial 	Port: COM3: PIXCI(RO) Camera Link Serial Port(COV
	OK Cancel Help

Figure 6-3: To Choose Serial Port on Tera Term

Please click "Setup" on menu bar, then choose "Serial Port" for communication method settings. Please refer to **Table 5-1** Communication Method for details of the settings.

Tera Term: Serial port setup					
Port:	СОМЗ • ОК				
Speed:	9600 🗸				
Data:	8 bit Cancel				
Parity:					
Stop bits:	1 bit 🗸 Help				
Flow control:	none -				
Transmit delay O msec/char O msec/line					

Figure 6-4: To Set up Serial Port on Tera Term

Please click "Setup" on menu bar, then choose "Terminal" for communication protocol settings. The following table shows the recommended settings.

Please note that these settings are recommended for a smoother operation, but not necessary to be.

TRAY

Item	Settings		
New-line (Receive)	CR		
New-line (Transmit)	CR+LF		
Local echo	Check the box		

Table 6-2: Communicat	ion Protocol

Tera Term: Terminal setup		23
Terminal size 80 X 24 I Term size = win size	New-line Receive: CR • Transmit: CR+LF •	OK Cancel
Auto window resize	☑ Local echo □ Auto switch (VT<-	Help
Kanji (receive)Kanji (tUTF-8UTF-8Half-width kanaHalf-	ransmit) → Kanji−in: width kana Kanji−out:	^[\$B
locale: japanese		

Figure 6-5: To Set up Terminal on Tera Term

After connecting camera with power, Tera Term will be initialized. Once the initialization is finished, you will see "OK" on the dialog box. Then you can send command to control camera. Please note that camera will start up only when you send out the command.

🙍 COM1 - Tera Term VT	
ファイル(E) 編集(E) 設定(S) コントロール(Q) ウィンドウ(W) ヘルプ(H)	
Wait	<u>^</u>
UK	

Figure 6-6: Initialization



6.4. Example of Viewer Software Settings

Here we take "EPIX®XCAP-LITE" as the example of viewer software settings. Please start up "XCAP".



Figure 6-7: Icon of XCAP

After starting up the software, you will see welcome message and license information. If you have already registered, please click OK directly.

If a warning or precaution concerning the license shows up, you may not complete the registration. In that case please register the license to continue.

1 EPIX® XCAP V3.8	x
Welcome to XCAP-I ite	
XCAP-Lite is a feature-limited software package for the PIXCI® Frame Grabbers. XCAP-Lite has the same	
appearance as XCAP-Ltd and XCAP-Std, our full-featured image analysis packages, but most Image	
Processing, Measurement, Analysis, and other advanced features are inactive.	
ACAP-Lite allows loading and viewing or images and image sequences from files, even if a PIACIE frame	
grabber isn't present. To create an image and browse the features of XCAP with the PIXCI® Frame Grabber	
closed or not installed, click:	
Image	
ivew image	
UK Madža	
Nodity Detter	
Patients	
File	
Load New Image	
Ludu New IIIage	
Load New Image Sequence	
to load and view an image or image sequence from file(s)	
To purchase XCAP-Ltd or XCAP-Std, and realize the full potential suggested by XCAP-Lite, contact EPIX, Inc.,	
or your distributor of EPIX® imaging products.	
The browsable Reference Manual is available under Help. A printed Reference Manual, covering XCAP-Lite,	
XCAP-Std, and XCAP-Ltd is also available from EPIX, Inc., or your distributor of EPIX® imaging products.	

Figure 6-8: Welcome message

Please click "PIXCI®" from XCAP menu, then choose "PIXCI®Open/Close" to open the dialog box. Please click "Open" to start the camera.

http://www.common.com/PIXCI® Open/Close			
Options			
	Multiple Devices	Advanced	
	Camera & Format	Driver Assistant	
Close Cancel Board Info			

Figure 6-9: To Open Camera



After starting, you will see the settings of camera and display area.

First, please set communication settings: choose "Configure" to set Camera Link configuration, bit, tap and color.

Please refer to **Table 3-1** to confirm the Camera Link format.

PIXC® EB1 Capt Proc Cr Norm Presst Capture Buf Res Trig Buffers	Camera Configute Resolution Timing MultiTap — Camera Configuration	
	Camera Link Base 💌	
Current Buffer	Base Configuration 12 bit × 2 tap 💌	
Frame Buffers 3 Field Count 3838 Clear Buffers	Non-Sid Configuration Options	
Live Snap Unlive Reset *	Tips Driver Assistant	

Figure 6-10: Configure Settings

Second, please set the resolution. Please refer to **Table 3-2** to confirm the resolution of each model.

PLXCI6 EB1 Capt Proc Cir Norm Preset Capture Buf Res Trig Buffers	Camera Configure Resolution Timing MultiTap Camera Resolution		
	Camera Scan	Area Scan	¥
	Horizontal Resolution	2048 (pixels/line	*
Current Buffer	Vertical Resolution	2048 (pixels/coli	*
Frame Buffers	Data Valid Signal	Use DVAL	-
3	Horizontal Offset	0	4
Field Count	Vertical Offset	0	4
Clear Buffers			
Live Shap Unlive Reset >		-	

Figure 6-11: Resolution Settings



Third, please set clock frequency of Camera Link in "Timing." Please refer to **Table 3-1** to confirm the Camera Link format.

🛅 EPIX® PIXCI® EB1: Generic Camera Link: Capture & A		
PIXCI® EB1 Capt Proc Cir Norm Preset Capture Buf Res Trig Buffers	Camera Configure Resolution Timing MultiTap Camera Mode & Timing	
Current Buffer 0 Frame Buffers 12 Field Count 0 Clear Buffers	Timing Mode Free-run Camera Link Clock 85.000 (MHz) Clocks per LVAL 1280 Lines per FVAL 1024	
Live Snap Unlive Report >		

Figure 6-12: Timing Settings

The settings are finished now. The image will be displayed either by clicking "Live" in "Capture" on the sub-window, or simply by clicking "Live Icon" on the left side of the sub-window.



Figure 6-13: Live Icon